WHAT IS CLAIMED IS:

1. A hydrogen generator comprising:

a reformer configured to reform a material using steam supplied from a evaporator that evaporates water supplied from a water supply portion into the steam, to generate a reformed gas containing hydrogen as a major component;

a material flow passage through which the steam and the material are supplied to the reformer;

a shifter configured to shift carbon monoxide contained in the reformed gas into carbon dioxide by a shift reaction;

a reformed gas flow passage through which the reformed gas is sent to the shifter;

a shifted gas flow passage through which the shifted gas from the shifter flows; and

a combustor configured to heat the reformer using a combustion gas, wherein

the reformed gas flow passage and the evaporator are configured to conduct heat exchange between them,

a part of heat of the reformed gas flowing through the reformed gas flow passage is used to generate the steam in the evaporator by the heat exchange to allow the reformed gas to be cooled, and

radiation heat from the shifter is transferred to the evaporator through the reformed gas flow passage and used to generate the steam in the evaporator.

2. The hydrogen generator according to Claim 1, further comprising:

a first evaporator configured to evaporate water supplied from a first water supply portion into first steam by the combustion gas derived from the combustor

and/or radiation heat of the reformer; and

a second evaporator configured to conduct heat exchange with the reformed gas flow passage, and to evaporate water supplied from a second water supply portion into second steam by using heat of the reformed gas which is recovered by the heat exchange with the reformed gas flow passage, wherein

the material flow passage includes:

a first steam flow passage through which the first steam and the material are supplied to the reformer, and

a second steam flow passage through which the second steam is supplied to the reformer.

3. The hydrogen generator according to Claim 2, wherein the second steam flow passage is connected to the first steam flow passage at a location upstream of the reformer in gas flow.

4. The hydrogen generator according to Claim 2, wherein the second evaporator is located above the shifter, and a water evaporation surface of the second evaporator is substantially horizontal.

5. The hydrogen generator according to Claim 2, wherein the second steam flow passage and the shifted gas flow passage are configured to exchange heat between them to allow the second steam to recover at least a part of the heat from the shifted gas.

6. The hydrogen generator according to Claim 3, having a body internally structured such that:

a plurality of axial walls are arranged concentrically to be spaced a predetermined distance apart from one another and a plurality of radial walls are provided at predetermined end portions of the axial walls so as to cross the axial walls to define the material flow passage, the reformed gas flow passage, the shifted gas flow passage, a combustion gas flow passage, and the first and second evaporators, the reformer extending along a center axis of the body, and the shifter being formed at a location in an axial direction of the reformer,

the first evaporator is disposed to allow at least one of heat exchange with the combustion gas flow passage and use of radiation heat from the reformer,

the first steam flow passage of the material flow passage is disposed to enclose an outer periphery of the reformer in such a manner that one end of the first steam flow passage is fluidically connected to the first evaporator, and an opposite end thereof is fluidically connected to one end face of the reformer in the axial direction corresponding to an upstream face of the reformer in gas flow,

the reformed gas flow passage is disposed so as to enclose the outer periphery of the reformer in such a manner that one end thereof is fluidically connected to an opposite face of the reformer in the axial direction corresponding to a downstream face of the reformer in gas flow and an opposite end thereof is disposed along and fluidically connected to one end face of the shifter in the axial direction corresponding to an upstream face of the shifter in gas flow, and the shifter is disposed to be opposed to the upstream face of the reformer in the axial direction,

the shifted gas flow passage is configured such that one end thereof is fluidically connected to an opposite end face of the shifter corresponding to a downstream face of

the shifter in gas flow,

the second evaporator is disposed adjacent the reformed gas flow passage extending along the upstream face of the shifter, and

the second steam flow passage is configured such that one end thereof is fluidically connected to the second evaporator and an opposite end thereof is fluidically connected the upstream face of the reformer.

7. The hydrogen generator according to Claim 2, further comprising:

a temperature detector configured to detect temperature of the shifter, wherein, based on temperature of the shifter which is detected by the temperature detector, an amount of the water supplied from the second water supply portion to the second evaporator is adjusted.

8. The hydrogen generator according to Claim 2, wherein the water supplied from the first water supply portion to the first evaporator is more in amount than the water supplied from the second water supply portion to the second evaporator.

9. The hydrogen generator according to Claim 2, wherein the second water supply portion configured to supply the water to the second evaporator includes a water supply unit and a supply pipe that leads the water supplied from the water supply unit to the second evaporator, and

a distance between a water outlet of the supply pipe and the water evaporation surface of the second evaporator is a distance at which a water droplet formed at the water outlet comes in contact with the water evaporation surface before the water droplet drops.

10. The hydrogen generator according to Claim 9, wherein the water outlet has a hole diameter of not less than 0.5mm and not more than 5mm.

11. The hydrogen generator according to Claim 9, wherein the water outlet has a flow cross-sectional area of not less than $0.7mm^2$ and not more than $20mm^2$.

12. The hydrogen generator according to Claim 11, wherein an amount of the water supplied from the water supply unit is not less than 0.1g/minute and not more than 2g/minute.

13. The hydrogen generator according to Claim 9, wherein the supply pipe has a flow cross-sectional area that gradually decreases toward the water outlet.

14. The hydrogen generator according to Claim 9, wherein an edge portion of a pipe wall of the supply pipe forming the water outlet is not on a horizontal plane.

15. The hydrogen generator according to Claim 14, wherein a tip end portion of the supply pipe including the water outlet has a cut out.

16. The hydrogen generator according to Claim 9, wherein the tip end portion of the supply pipe including the water outlet is provided perpendicular to the water evaporation surface.

17. The hydrogen generator according to Claim 9, wherein the tip end portion of the

supply pipe including the water outlet is provided in parallel with the water evaporation surface.

18. The hydrogen generator according to Claim 1, wherein the evaporator is constituted by one evaporator and the evaporator is configured to recover the heat of the reformed gas, heat of the combustion gas derived from the combustor and/or radiation heat from the reformer.

19. The hydrogen generator according to Claim 18, having a body internally structured such that:

a plurality of axial walls are arranged concentrically to be spaced a predetermined distance apart from one another and a plurality of radial walls are provided at predetermined end portions of the axial walls so as to cross the axial walls to define the material flow passage, the reformed gas flow passage, the shifted gas flow passage, the combustion gas flow passage, and the evaporator, the reformer extending along a center axis of the body, and the shifter being located radially outward relative to the reformer so as to enclose an outer periphery of the reformer in the axial direction,

the material flow passage is disposed so as to enclose the outer periphery of the reformer, and one end of the reformed gas flow passage is fluidically connected to one end face of the reformer in the axial direction corresponding to a downstream face of the reformer,

the reformed gas flow passage is configured such that one end portion thereof is fluidically connected to an opposite end face of the reformer in the axial direction corresponding to a downstream face of the reformer and an opposite end thereof is

disposed along and fluidically connected to one end face of the shifter, corresponding to an upstream face of the shifter,

the shifted gas flow passage is configured such that one end thereof is fluidically connected to an opposite end face of the shifter corresponding to a downstream face of the shifter, and

the evaporator is disposed adjacent the combustion gas flow passage and the reformed gas flow passage.

20. The hydrogen generator according to Claim 18, further comprising:

a temperature detector configured to detect temperature of the shifter, wherein, based on the temperature of the shifter which is detected by the temperature detector, an amount of water supplied from the water supply portion to the evaporator is adjusted.

21. A fuel cell power generation system comprising:

a hydrogen generator including:

a reformer configured to reform a material using steam supplied from a evaporator that evaporates water supplied from a water supply portion into the steam, to generate a reformed gas containing hydrogen as a major component;

a material flow passage through which the steam and the material are supplied to the reformer;

a shifter configured to shift carbon monoxide contained in the reformed gas into carbon dioxide by a shift reaction;

a reformed gas flow passage through which the reformed gas is sent to the shifter;

a shifted gas flow passage through which the shifted gas from the shifter flows; and

a combustor configured to heat the reformer using a combustion gas, wherein

the reformed gas flow passage and the evaporator are configured to conduct heat exchange between them,

a part of heat of the reformed gas flowing through the reformed gas flow passage is used to generate the steam in the evaporator by the heat exchange to allow the reformed gas to be cooled, and

radiation heat from the shifter is transferred to the evaporator through the reformed gas flow passage and used to generate the steam in the evaporator; and

a fuel cell configured to generate an electric power by using a fuel gas containing hydrogen as a major component and an oxidizing gas, the fuel gas being supplied from the hydrogen generator.